

IN THE CLAIMS:

1. (Currently Amended) A firing furnace comprising:
a combusting means;
a firing furnace main body for heating and firing a member; and
a methane reforming device filled with a methane reforming catalyst,
wherein said combusting means is for generating a combustion gas by combustion of a fuel containing methane ducted therein and after firing for exhausting the combustion gas from the furnace, for combusting a fuel containing methane flown therein for generating a combustion gas, and a firing furnace main body for heating and firing a member to be fired, that has been conveyed into the inside thereof, by a combustion gas and exhausting the combustion gas after firing the member to the outside,
wherein a methane reforming device filled with a said methane reforming catalyst is in the inside thereof, for producing a reformed gas containing hydrogen and carbon dioxide by contacting the methane reforming catalyst with a reforming material comprising a methane sub fuel of methane and steam, while simultaneously heating the reforming material

with the combustion gas to make methane in the reforming material react with steam composed of a methane sub fuel for reformation having methane flown therein as a major component and steam with the methane reforming catalyst while heating the material by the combustion gas so as to make methane in the reforming material react with steam, is further provided.

2. (Currently Amended) The firing furnace according to claim 1, wherein the methane reforming device is provided located inside the firing furnace main body for causing contacting the reforming material to contact with the methane reforming catalyst while combustion gas heats heating the reforming material by the combustion gas so as to produce a reformed gas.

3. (Currently Amended) The firing furnace according to claim 1, wherein the methane reforming device is provided located outside the firing furnace main body for contacting causing the reforming material with to contact the methane reforming catalyst while heating so that combustion gas exhausted from the firing furnace main body heats the reforming material by the combustion gas exhausted to the

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~~outside of the firing furnace main body so as to produce the reformed gas.~~

4. (Currently Amended) The firing furnace according to claim 1, further comprising a fuel cell for generating electricity by the reaction of hydrogen and oxygen or air, wherein said fuel cell is for using at least a part or the entirety of hydrogen contained in the reformed gas is used for reaction with oxygen or air in the fuel cell as hydrogen for the fuel cell.

5. (Original) The firing furnace according to claim 1, further comprising a hydrogen separating device for separating the reformed gas produced in the methane reforming device by flowing the reformed gas into the inside thereof for selectively separating hydrogen in the reformed gas into a hydrogen fuel containing hydrogen as a major component and a residual gas containing carbon dioxide.

6. (Currently Amended) The firing furnace according to claim 5, wherein further comprising a fuel cell, said fuel cell for using at least a part or the entirety of the hydrogen fuel is used for reaction with oxygen or air in the fuel cell as hydrogen for the fuel cell.

7. (Currently Amended) The firing furnace according to claim 5, wherein further comprising means for mixing at least a part or the entirety of hydrogen fuel is mixed with a methane main fuel for to form a fuel mixture containing comprising methane as a major component so as to provide a fuel mixture, and wherein said combustible means is for combustible the fuel mixture in the combustible means.

8. (Currently Amended) The firing furnace according to claim 5, wherein further comprising a fuel cell, said fuel cell for using a part of hydrogen fuel is used for reaction with oxygen or air in the fuel cell as hydrogen for the fuel cell, and means for mixing a remainder part is mixed with a methane main fuel for to form a fuel mixture containing comprising methane as a major component so as to provide a

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~~fuel mixture, and wherein said combusting means is for~~
~~combusting the fuel mixture in the combusting means.~~

9. (Original) The firing furnace according to claim 7, wherein the volume ratio of the methane sub fuel for reformation and the methane main fuel for mixture (methane sub fuel for reformation : methane main fuel for mixture) is 5:95 to 100:0.

10. (Original) The firing furnace according to claim 8, wherein the volume ratio of the methane sub fuel for reformation and the methane main fuel for mixture (methane sub fuel for reformation : methane main fuel for mixture) is 5:95 to 100:0.

11. (Currently Amended) The firing furnace according to claim 5, further comprising a firing means, wherein the residual gas exhausted from the hydrogen separating device is combusted by said firing means.

12. (Currently Amended) The firing furnace according to claim 5, further comprising a carbon dioxide fixing device for fixing carbon dioxide in the residual gas separated by the hydrogen separating device ~~not so as to discharge it device, so that said firing furnace does not discharge carbon dioxide in a gas gaseous state from the furnace. to the outside thereof.~~

13. (Currently Amended) The firing furnace according to claim 12, wherein the carbon dioxide fixing device contains sodium hydroxide as a fixing agent for fixing carbon dioxide ~~so as to produce sodium carbonate by making sodium hydroxide react with carbon dioxide.~~

14. (Currently Amended) The firing furnace according to claim 1, wherein the firing furnace main body is a firing furnace main body ~~of continuous type~~ firing furnace main body for continuously conveying a member to be fired continuously into the inside ~~thereof~~ into the furnace main body and continuously conveying the such member continuously to the outside from the furnace main body after heating the such member to be fired in the inside thereof.

15. (Currently Amended) The firing furnace according to claim 1, wherein at least one of the methane sub fuel for reformation and the methane main fuel for mixture is a liquefied natural gas (LNG).

16.-17. (Cancelled)

18. (Currently Amended) A firing method comprising the steps of:

generating a combustion gas by flowing a fuel containing methane into a combustible means and combusting such fuel, said generating comprising:

contacting the methane reforming catalyst with a reforming material comprising a methane sub fuel of methane and steam to produce a reformed gas containing hydrogen and carbon dioxide, while simultaneously heating the reforming material with the combustion gas to make methane in the reforming material react with steam;

introducing the combustion gas generated in the combustible means into the inside of a firing furnace main body,

heating and firing a member to be fired with the
combustion gas, the member having been conveyed into the
inside furnace main body by the combustion gas, and

exhausting the combustion gas after firing to the outside
out of the firing furnace main body after firing,

wherein a reforming material composed of a methane sub
fuel for reformation having methane flown therein as a major
component and steam is flown into a methane reforming device
filled with a methane reforming catalyst in the inside
thereof, and

wherein the reforming material is contacted with the
methane reforming catalyst while heating the material by
combustion gas so as to make methane in the reforming material
react with steam for producing a reformed gas containing
hydrogen and carbon dioxide.

19. (Currently Amended) The firing method according to
claim 18, wherein the methane reforming device is provided
located inside the firing furnace main body for contacting
causing the reforming material with to contact the methane
reforming catalyst while heating the combustion gas heats the

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reforming material by the combustion gas so as to produce a reformed gas.

20. (Currently Amended) The firing method according to claim 18, wherein the methane reforming device is provided located outside the firing furnace main body for contacting causing the reforming material with to contact the methane reforming catalyst while heating the combustion gas exhausted out of the firing furnace main body heats the reforming material by the combustion gas exhausted to the outside of the firing furnace main body so as to produce a reformed gas.

21. (Cancelled)

22. (Currently Amended) The firing method according to claim 18, wherein at least a part or the entirety of hydrogen contained in the reformed gas reacts with oxygen or air in the a fuel cell as hydrogen for the fuel cell for the power generation.

23. (Currently Amended) The firing method according to claim 18, wherein the reformed gas produced in the methane reforming device is ~~flewn into the inside of a~~ conveyed into a hydrogen separating device for selectively separating hydrogen in the reformed gas into hydrogen fuel containing hydrogen as a major component and a residual gas containing carbon dioxide.

24. (Currently Amended) The firing method according to claim 23, wherein at least a part ~~or the entirety~~ of hydrogen fuel is used for reaction with oxygen or air in the fuel cell as hydrogen for ~~the~~ a fuel cell.

25. (Currently Amended) The firing method according to claim 23, wherein at least a part ~~or the entirety~~ of hydrogen fuel is mixed with a methane main fuel ~~for~~ to form a fuel mixture ~~containing~~ comprising methane, ~~methane~~ as a major component ~~so as to provide~~ a fuel mixture, and wherein said combusting means is for combusting ~~the~~ fuel mixture ~~in~~ combusting means.

26. (Currently Amended) The firing method according to claim 23, wherein a part of hydrogen fuel is used for reaction with oxygen or air in ~~the~~a fuel cell, and a remainder part is mixed with a methane main fuel ~~for~~ to form a fuel mixture containing methane as a major component, ~~component~~ ~~so as to~~ provide a fuel mixture, and wherein said combusting means is for combusting the fuel mixture in the combusting means.

27. (Currently Amended) The firing method according to claim 25, wherein the mixture of methane sub fuel for reformation and the methane main fuel ~~for~~ mixture are used with the have a volume ratio (methane sub fuel for reformation : methane main fuel for mixture) of 5:95 to 100:0.

28. (Currently Amended) The firing method according to claim 26, wherein the mixture of methane sub fuel for reformation and the methane main fuel ~~for~~ mixture are used with the have a volume ratio (methane sub fuel for reformation : methane main fuel for mixture) of 5:95 to 100:0.

29. (Currently Amended) The firing method according to claim 23, wherein the residual gas exhausted from the hydrogen separating device is combusted in the firing means.

30. (Currently Amended) The firing method according to claim 23, wherein the residual gas separated in the hydrogen separating device is ~~flewn into~~ conveyed to a carbon dioxide fixing device for fixing carbon dioxide in the residual gas so that said firing furnace main body does not discharge gaseous carbon dioxide out of the furnace main body ~~not so as to discharge it in a gas state to the outside thereof~~.

31. (Currently Amended) The firing method according to claim 30, wherein the carbon dioxide fixing device contains sodium hydroxide as a fixing agent for fixing carbon dioxide ~~so as to produce sodium carbonate by making sodium hydroxide react with carbon dioxide~~.

32. (Currently Amended) The firing method according to claim 18, wherein a the firing furnace main body ~~ef~~ is a continuous type firing furnace main body for continuously conveying the a member to be fired ~~eontinuously~~ into the

~~inside into the furnace main body and continuously conveying the such member continuously to the outside out of the furnace main body after heating the such member to be fired in the inside is used as the firing furnace main body.~~

33. (Currently Amended) The firing method according to claim 18, wherein a liquefied natural gas (LNG) is used as at least one of the methane sub fuel for reformation and the methane main fuel ~~for forming a mixture is a liquefied natural gas.~~

34. (Currently Amended) The firing method according to claim 18, wherein a ceramic is used as the material of the ~~a member to be fired comprises a ceramic material.~~

35. (Currently Amended) The firing method according to claim 18, wherein a honeycomb structure is used as the member to be fired ~~comprises a honeycomb structure.~~

36. (New) The firing furnace according to claim 4, further comprising a hydrogen separating device for separating the reformed gas produced in the methane reforming device by flowing the reformed gas into the hydrogen separating device for selectively separating hydrogen in the reformed gas into a hydrogen fuel comprising hydrogen and a residual gas comprising carbon dioxide.

37. (New) The firing furnace according to claim 4, wherein the firing furnace main body is a continuous firing furnace main body for continuously conveying a member to be fired into the furnace main body and continuously conveying such member from the furnace main body after heating such member.

38. (New) The firing furnace according to claim 5, wherein the firing furnace main body is a continuous firing furnace main body for continuously conveying a member to be fired into the furnace main body and continuously conveying such member from the furnace main body after heating such member.

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39. (New) The firing furnace according to claim 4, wherein at least one of methane sub fuel for reformation and methane main fuel for mixture is a liquefied natural gas.

40. (New) The firing furnace according to claim 5, wherein at least one of methane sub fuel for reformation and methane main fuel for mixture is a liquefied natural gas.

41. (New) The firing method according to claim 22, wherein the reformed gas produced in the methane reforming device is conveyed into the hydrogen separating device for selectively separating hydrogen in the reformed gas into hydrogen fuel containing hydrogen as a major component and a residual gas containing carbon dioxide.

42. (New) The firing method according to claim 22, wherein the firing furnace main body is a continuous firing furnace main body for continuously conveying a member to be fired into the furnace main body and continuously conveying such member out of the furnace main body after heating such member.

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43. (New) The firing method according to claim 23, wherein the firing furnace main body is a continuous firing furnace main body for continuously conveying a member to be fired into the furnace main body and continuously conveying such member out of the furnace main body after heating such member.

44. (New) The firing method according to claim 22, wherein at least one of the methane sub fuel for reformation and the methane main fuel forming a mixture is a liquefied natural gas.

45. (New) The firing method according to claim 23, wherein at least one of the methane sub fuel for reformation and the methane main fuel forming a mixture is a liquefied natural gas.